The New 1981-2010 Climate Normals

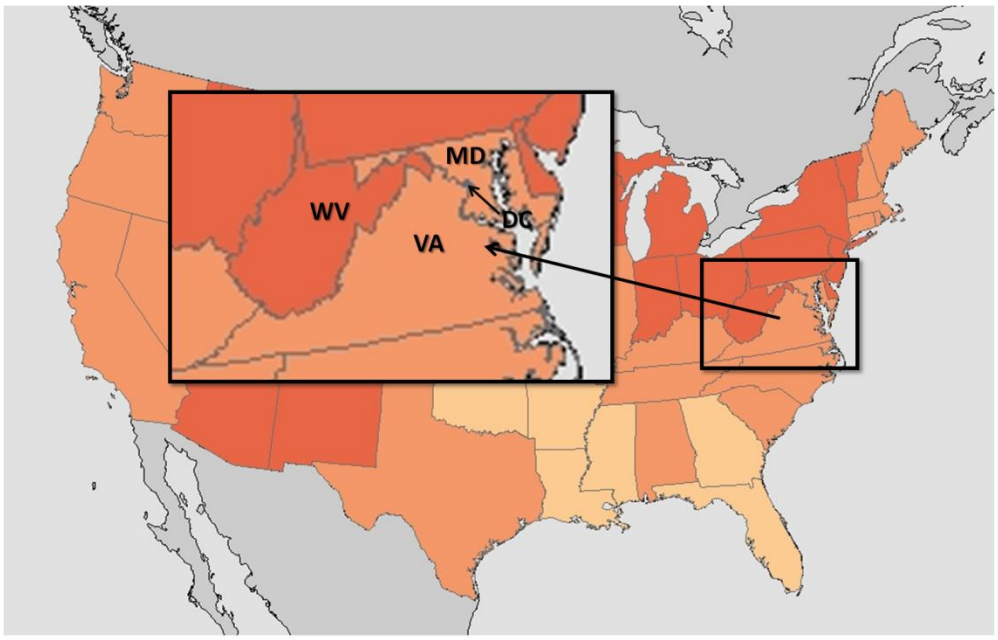
National Weather Service Baltimore/Washington

By Jared Klein- General Forecaster/Climate Program Leader

The NOAA/National Climatic Data Center (NCDC) recently released the 1981-2010 climate normals during the mid summer of 2011. These new 1981-2010 climate normals will be incorporated into the National Weather Service climate products as of August 1, 2011, which replaces the previous 30-year normals from 1971 to 2000. Climate normals are calculated by NCDC for thousands of stations across the United States every decade, and are updated using the most recent 30-year period of data. Normals are more than just a 30-year averaging of meteorological parameters as they incorporate other factors than just the raw data into the computation. These factors account for missing and questionable data, and location and instrument changes of a station. The climate normals also include numerous statistical computations (e.g., probabilities, frequencies, percentiles). Some widely-used normals include temperature (max, min and average), precipitation, snow (snowfall and snow depth) on time-scales ranging from hourly (for select sites) to annually.

Statewide maximum temperatures increased by 0.3°F – 0.5°F in Maryland and Virginia, and 0.5°F – 0.7°F in West Virginia with the new 1981-2010 climate normals compared to the previous 1971-2000 climate normals using the same computational technique (Fig. 1a,b). Likewise, minimum-temperature normals increased by 0.3°F – 0.5°F in Maryland, and 0.5°F – 0.7°F in Virginia and West Virginia.

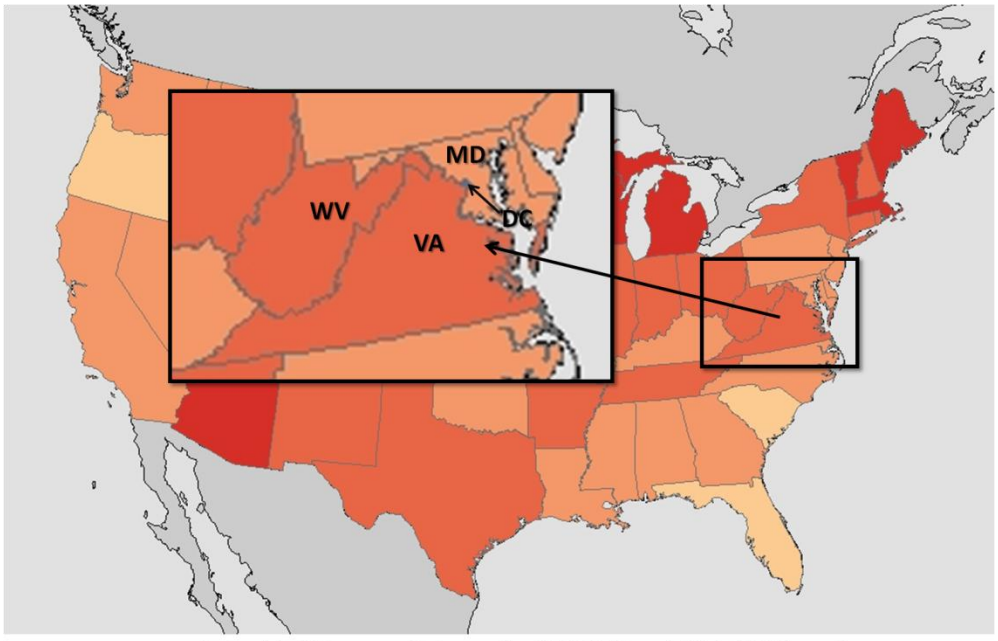
a)



Statewide Differences Between the 1981-2010 and 1971-2000 Normals
Maximum Temperature (F)

-.9 to -.7 | -.7 to -.5 | -.5 to -.3 | -.3 to -.1 | -.1 to +.1 | +.1 to +.3 | +.3 to +.5 | +.5 to +.7 | +.7 to +.9

b)



Statewide Differences Between the 1981-2010 and 1971-2000 Normals
Minimum Temperature (F)

-.9 to -.7 | -.7 to -.5 | -.5 to -.3 | -.3 to -.1 | -.1 to +.1 | +.1 to +.3 | +.3 to +.5 | +.5 to +.7 | +.7 to +.9

Figure 1. **Source NCDC. < http://www.ncdc.noaa.gov/oa/climate/normals/usnormals.html >**

A closer look at individual climate stations in the Baltimore/Washington region reveal differences between the 1981-2010 climate normals and the previous 1970-2000 normals. Some of these changes in temperature, precipitation and snowfall are discussed below.

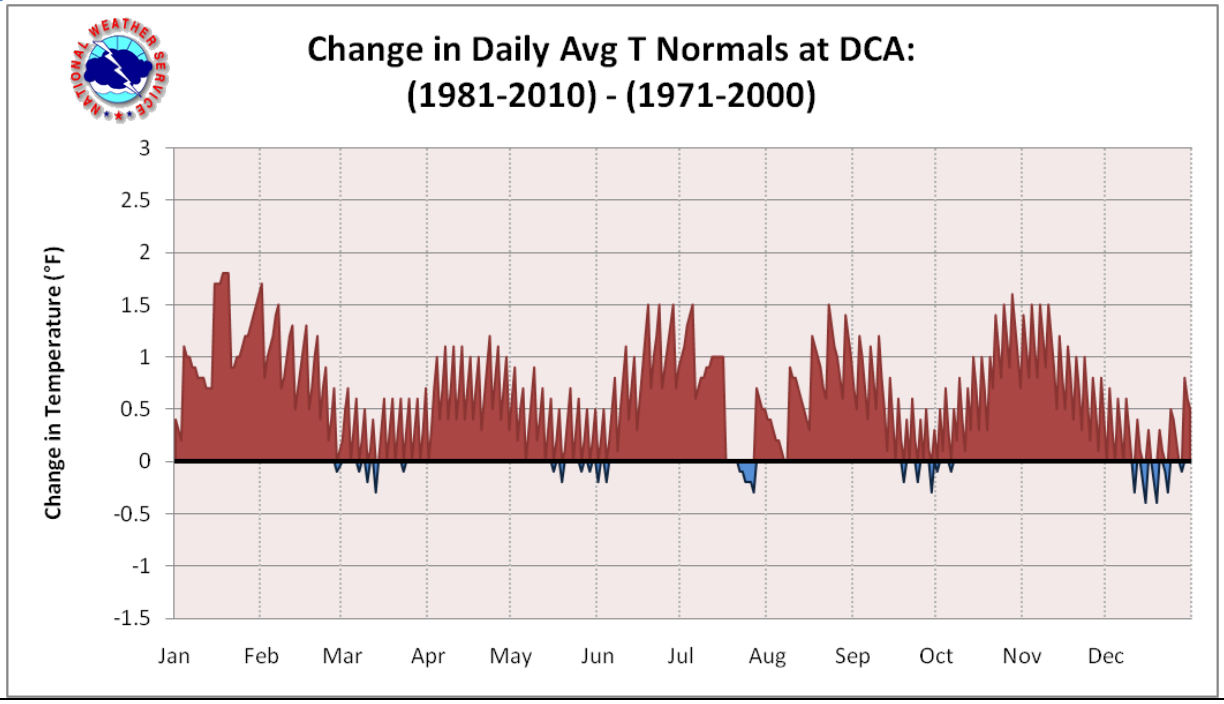
Change in Normals: Average Temperatures

The normal average annual temperature has:

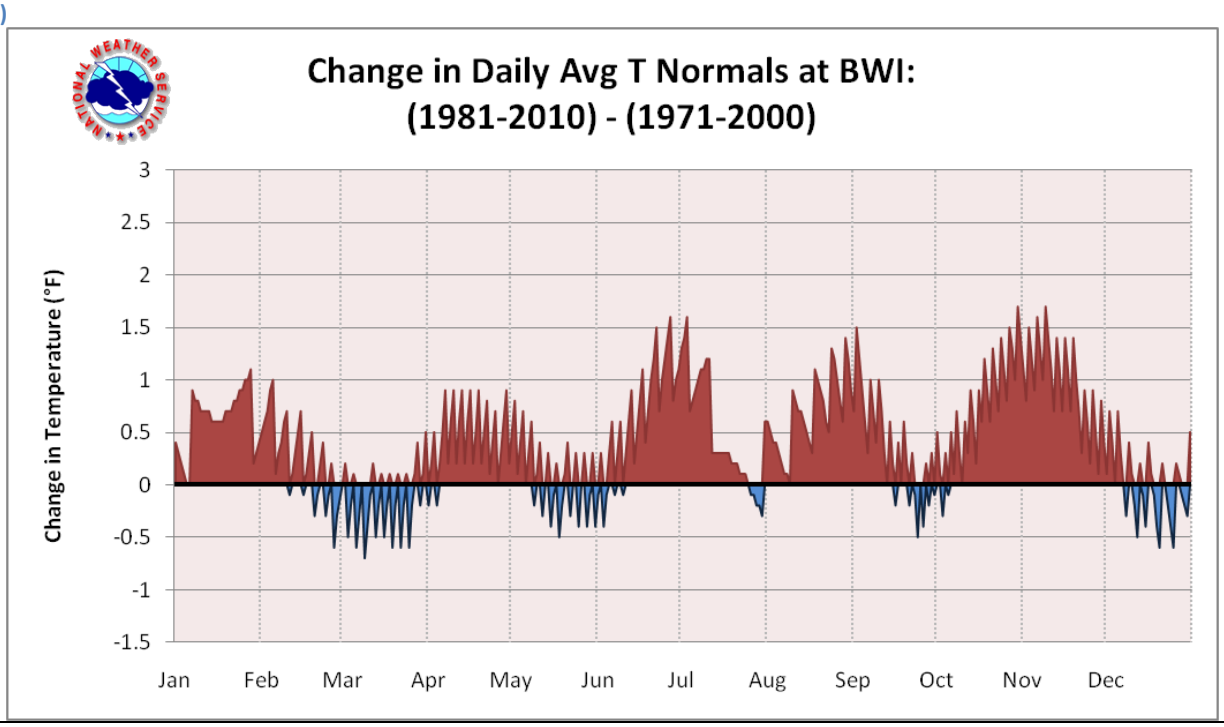
Increased 0.7°F from 57.5°F to 58.2°F at Washington D.C. (**DCA**)
Increased 0.5°F from 54.6°F to 55.1°F at Baltimore, MD (**BWI**)
Increased 1.1°F from 54.2°F to 55.3°F at Dulles, VA (**IAD**)

Daily normals of average temperatures are also dominated by a warming trend at all three stations (Fig. 2a-c). Daily normal temperatures have increased most commonly between 0.5°F and 1.5°F at DCA and BWI, and 1.0°F and 2°F at IAD. Note that some degree of the daily change in temperatures can be attributed to differences in significant digits (as much as ±0.5°F) between the 1971-2000 climate normals (rounded to the nearest whole °F) and the 1981-2010 climate normals (rounded to the nearest tenth °F).

a)


Change in Daily Avg T Normals at DCA:
(1981-2010) - (1971-2000)
Change in Temperature (°F)
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

b)


Change in Daily Avg T Normals at BWI:
(1981-2010) - (1971-2000)
Change in Temperature (°F)
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

c)

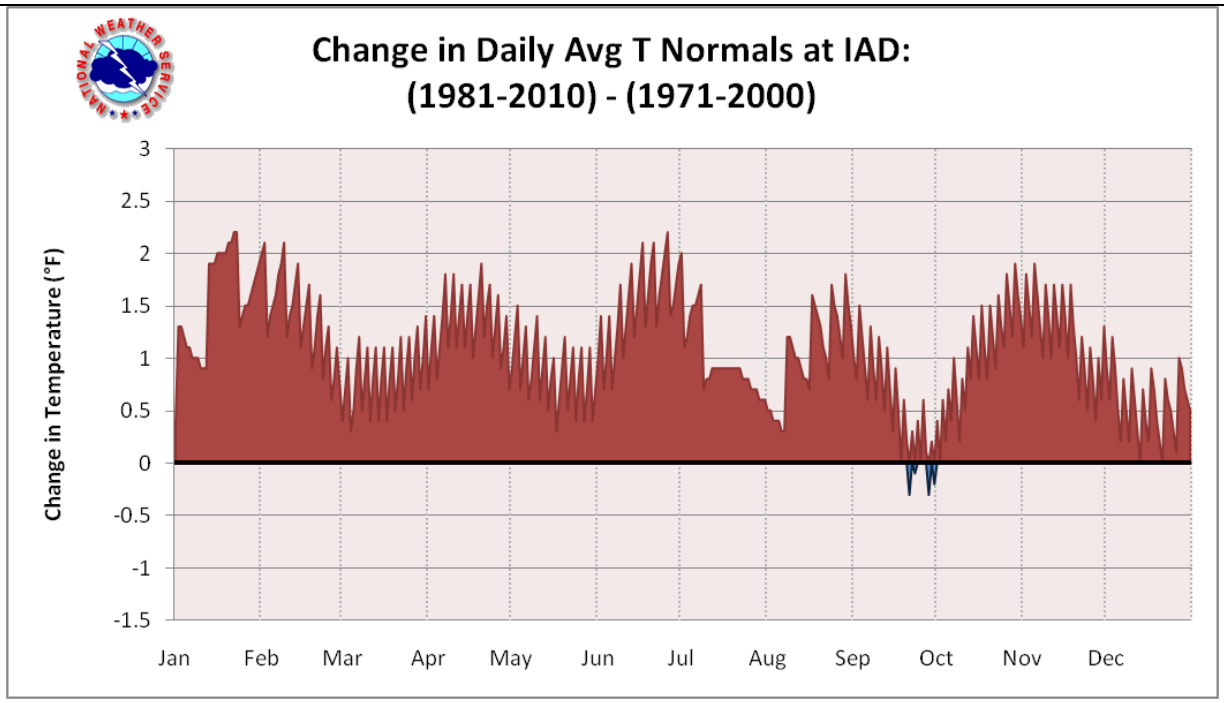


Figure 2. NWS Baltimore/Washington

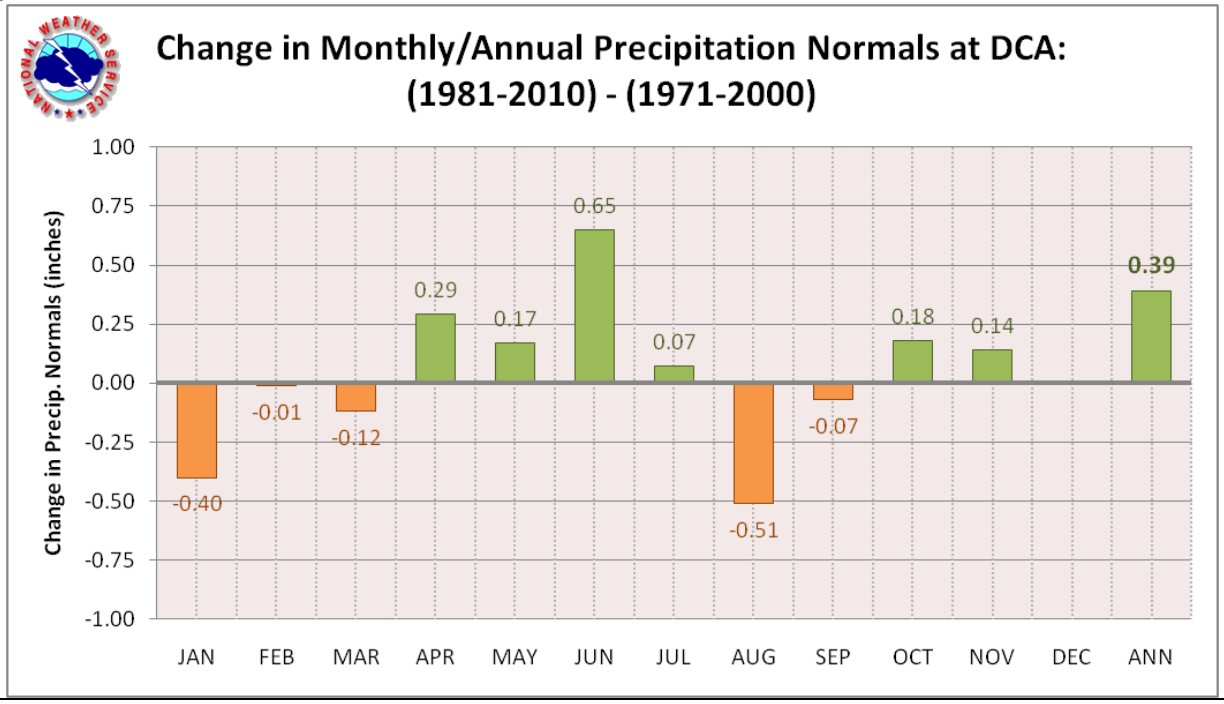
Change in Normals: Precipitation

The normal annual precipitation has:

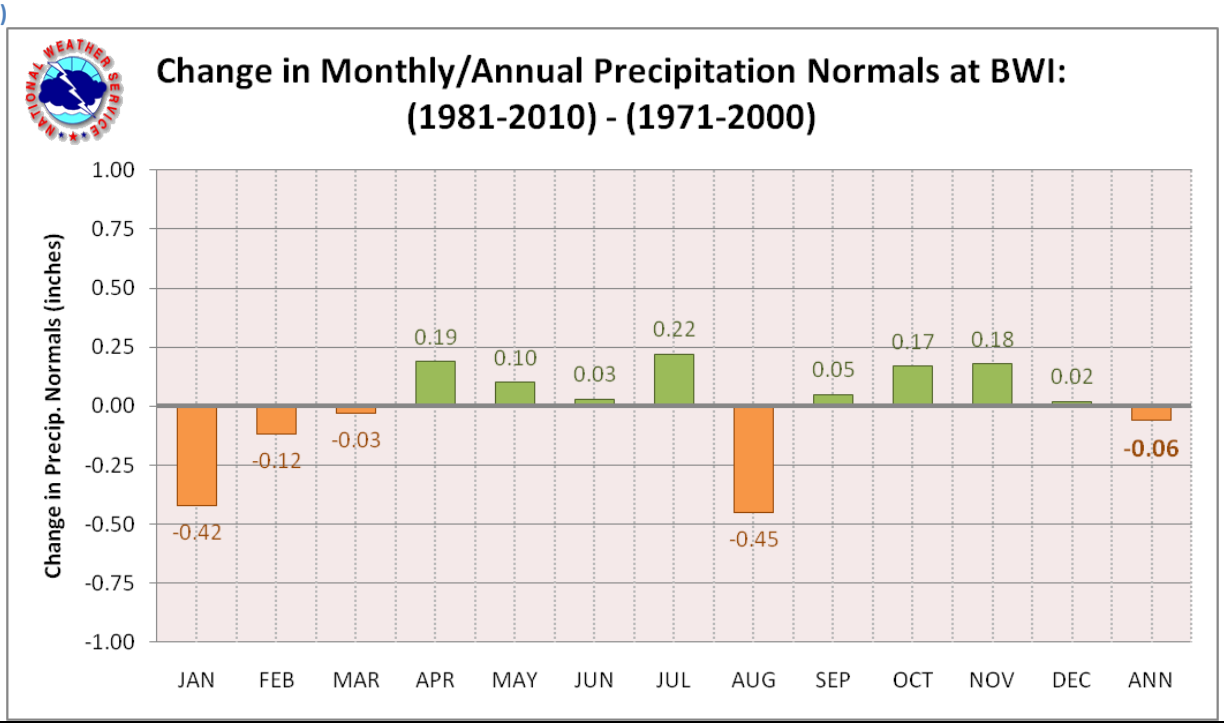
Increased 0.39 inches from 39.35 inches to 39.74 inches at Washington D.C. (**DCA**)
Decreased 0.06 inches from 41.94 inches to 41.88 inches at Baltimore, MD (**BWI**)
Decreased 0.26 inches from 41.80 inches to 41.54 inches at Dulles, VA (**IAD**)

Monthly precipitation normals at all three stations have generally trended drier during the late winter and early spring, followed by a notable wetter trend during the late spring and early summer (Fig. 3a-c). Both DCA and BWI have shown secondary upswings in precipitation during the late fall. January and August have shown the largest decrease in precipitation at all three sites. The largest change in normal precipitation of any month at any of the sites is the increase of 0.65 inches at DCA in June.

a)


Change in Monthly/Annual Precipitation Normals at DCA:
(1981-2010) - (1971-2000)
Change in Precip. Normals (inches)
1.00
0.75
0.50
0.25
0.00
-0.25
-0.50
-0.75
-1.00
-0.40
-0.01
-0.12
0.29
0.17
0.65
0.07
-0.51
-0.07
0.18
0.14
0.39
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
ANN

b)


Change in Monthly/Annual Precipitation Normals at BWI:
(1981-2010) - (1971-2000)
Change in Precip. Normals (inches)
1.00
0.75
0.50
0.25
0.00
-0.25
-0.50
-0.75
-1.00
-0.42
-0.12
-0.03
0.19
0.10
0.03
0.22
-0.45
0.05
0.17
0.18
0.02
-0.06
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
ANN

c)

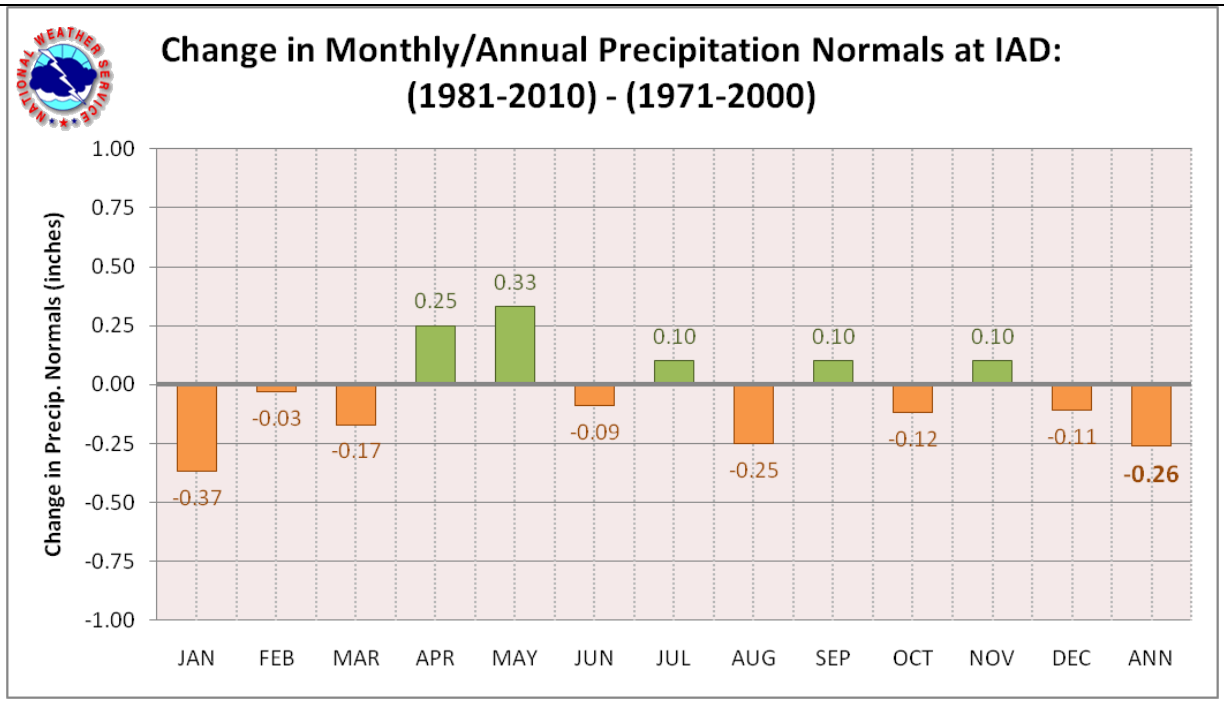


Figure 3. NWS Baltimore/Washington

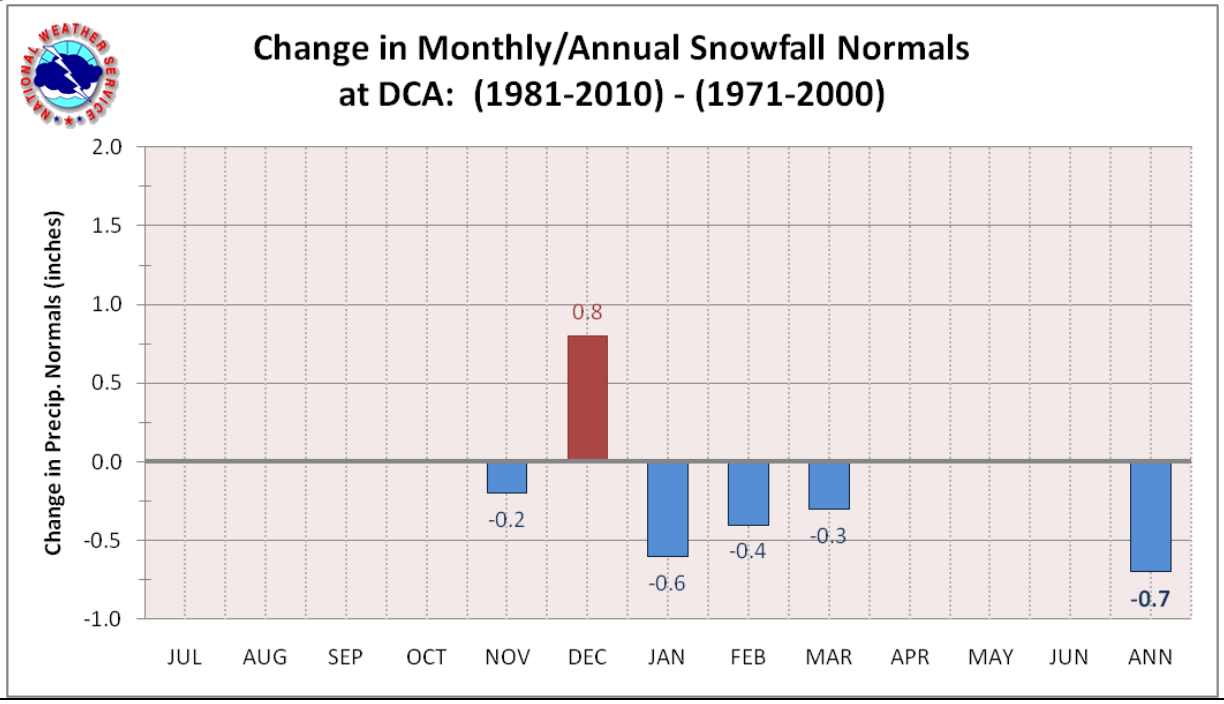
Change in Normals: Snowfall

The normal seasonal (July–June) snowfall has:

Decreased 0.7 inches from 15.2 inches to 14.5 inches at Washington D.C. (**DCA**)
Increased 2.0 inches from 18.2 inches to 20.2 inches at Baltimore, MD (**BWI**)
Increased 0.8 inches from 21.2 inches to 22.0 inches at Dulles, VA (**IAD**)

Monthly snowfall normals at all three stations have increased in December, but decreased in November, January and March (Fig. 4a-c). Normal snowfall in February has decreased at DCA, but increased the most out of any month at BWI and IAD. The increase in both February snowfall and annual snowfall was strongly weighted by the snowiest month in February 2010 and snowiest winter of 2009-2010 on record at BWI and IAD. If we hypothetically removed the 2009-2010 seasonal snowfall totals of 77.0 inches at BWI and 72.3 inches at IAD, then the 1981-2010 normal seasonal snowfall would decrease by 2.6 inches at BWI and 2.5 inches at IAD. It would also shift the normal seasonal snowfall totals slightly below the 1971-2000 normals.

a)


Change in Monthly/Annual Snowfall Normals
at DCA: (1981-2010) - (1971-2000)
Change in Precip. Normals (inches)
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
0.8
-0.2
-0.6
-0.4
-0.3
-0.7
JUL
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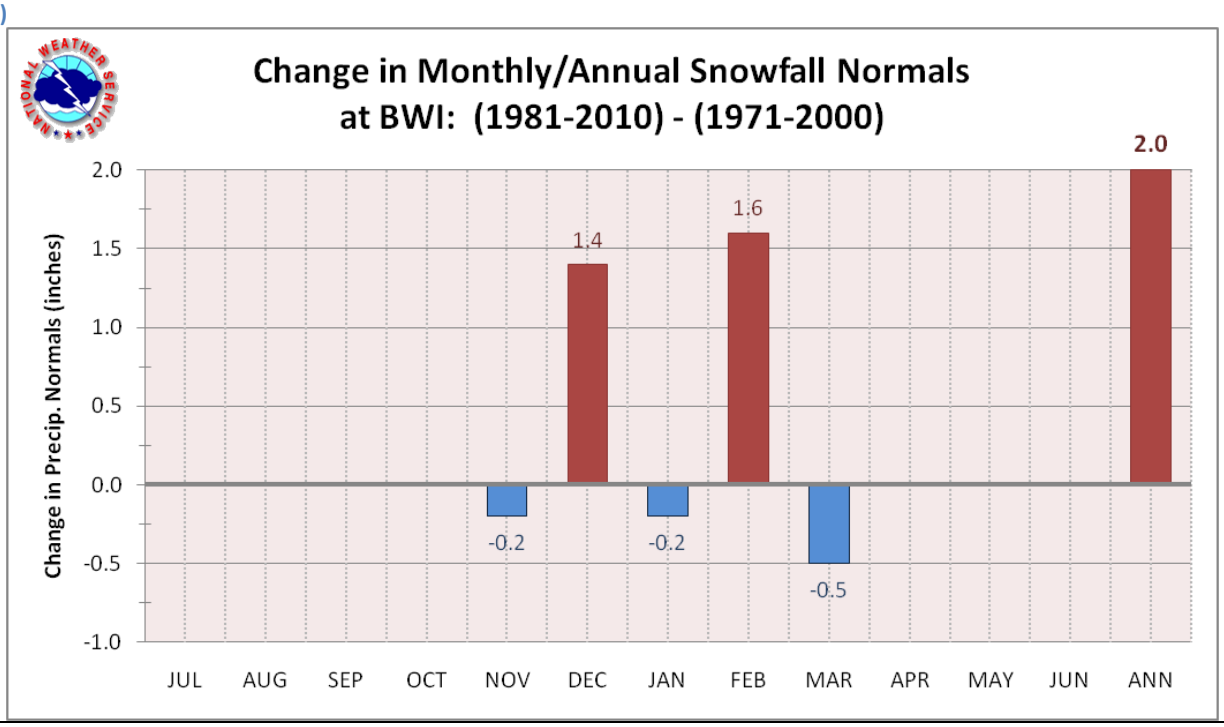
JUN
ANN

b)


Change in Monthly/Annual Snowfall Normals
at BWI: (1981-2010) - (1971-2000)
Change in Precip. Normals (inches)
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
2.0
1.6
1.4
-0.2
-0.2
-0.5
JUL
AUG
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DEC
JAN
FEB
MAR
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MAY
JUN
ANN

c)

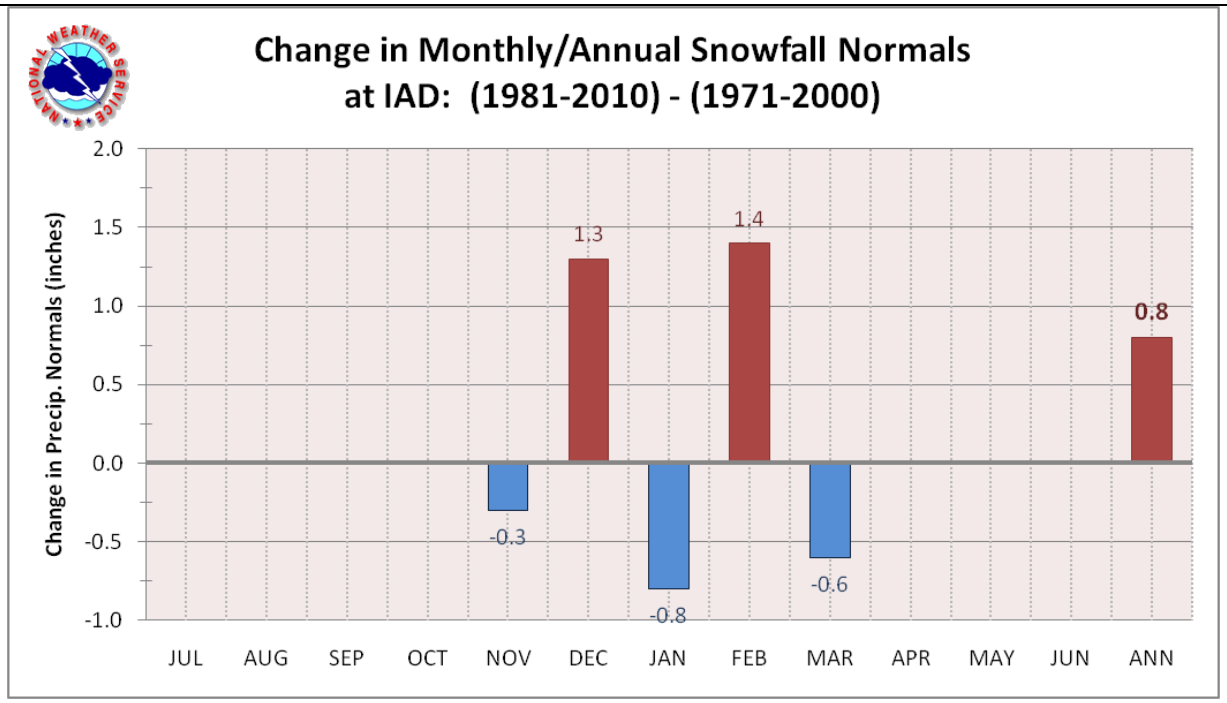


Figure 4. NWS Baltimore/Washington

Click on the following links to access more charts pertaining to the 1981-2010 climate normals:

DCA	BWI	IAD

Also, visit the NCDC link below to access more information about the 1981-2010 climate normals:

http://www.ncdc.noaa.gov/oa/climate/normals/usnormals.html

-Additional information and data from the 1981-2010 climate normals for Washington D.C. (DCA), Baltimore (BWI) and Dulles (IAD), as well as Martinsburg (MRB), Hagerstown (HGR),

Charlottesville (CHO) and Maryland Science Center (DMH) will be added to the NWS Baltimore/Washington climate website in the future. Please check back in the next few months.

DCA Normals

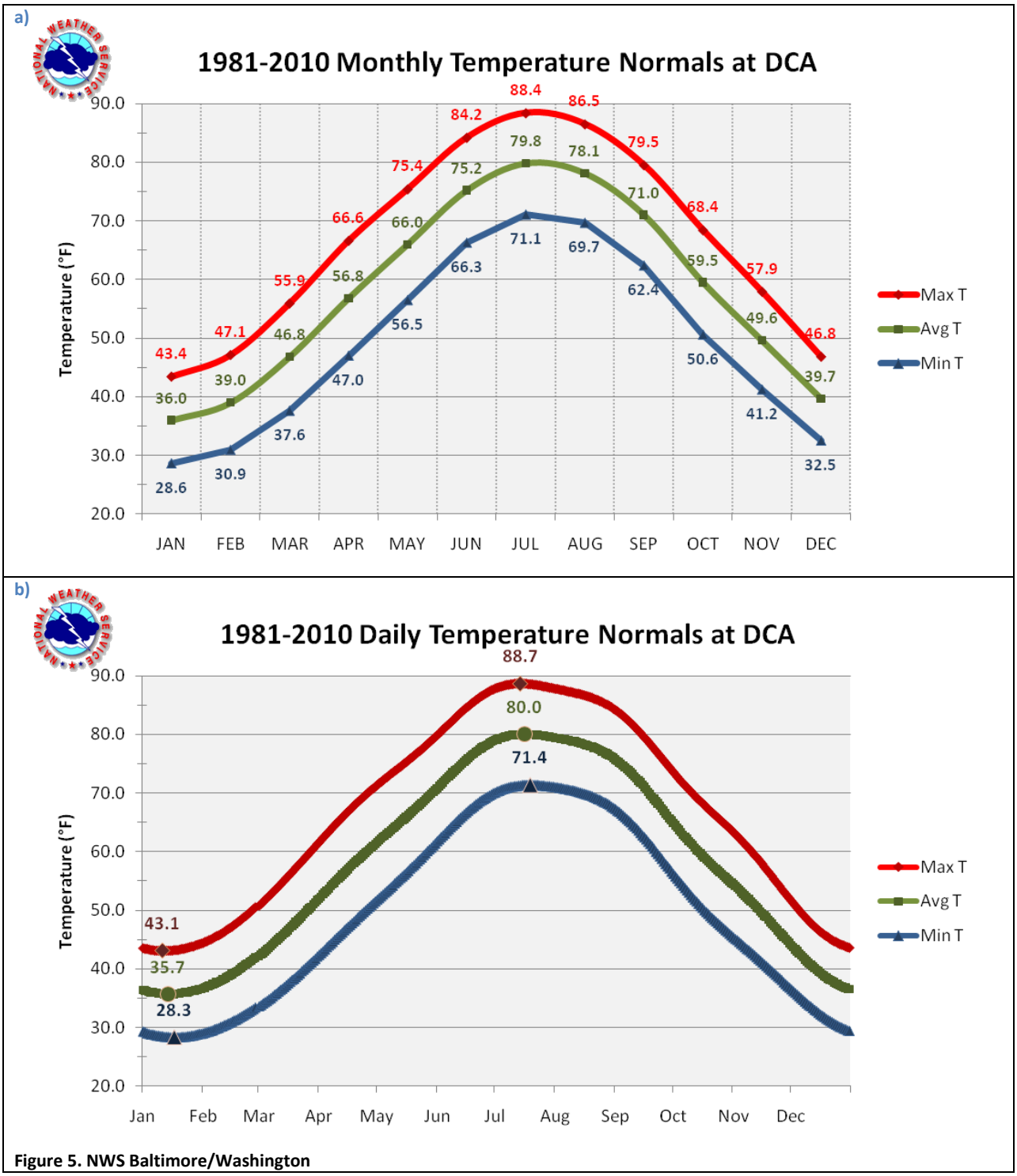
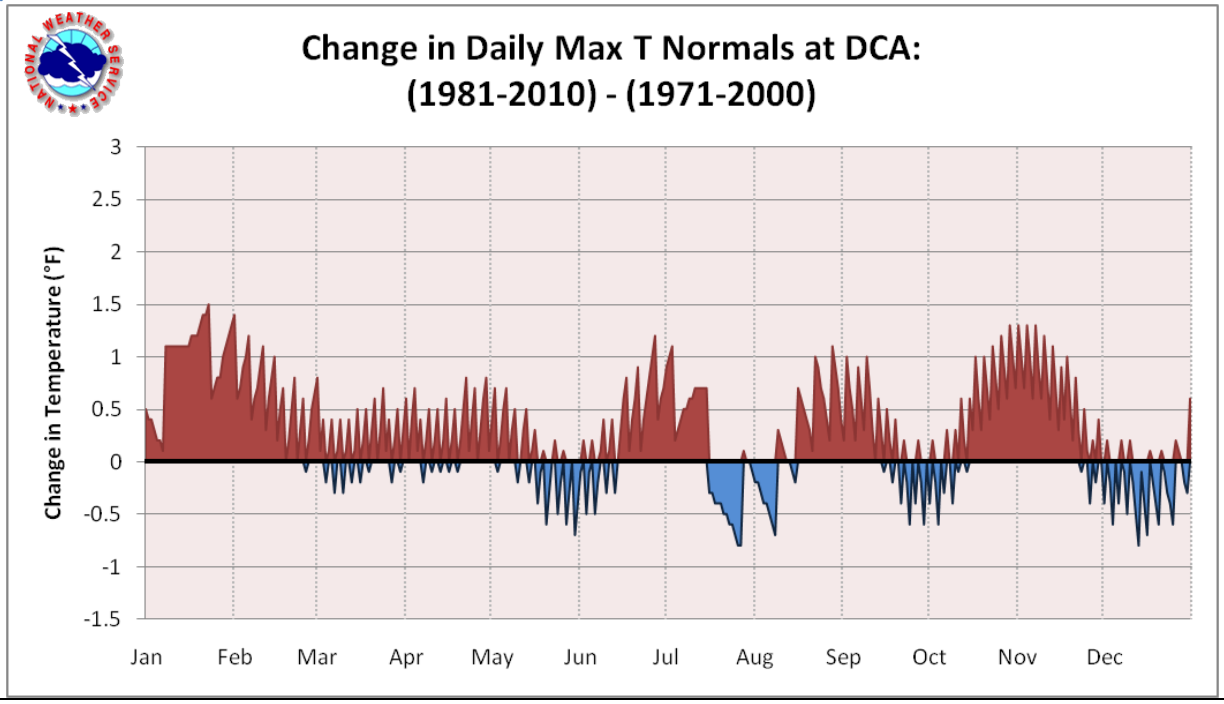


Figure 5. NWS Baltimore/Washington

a)



b)

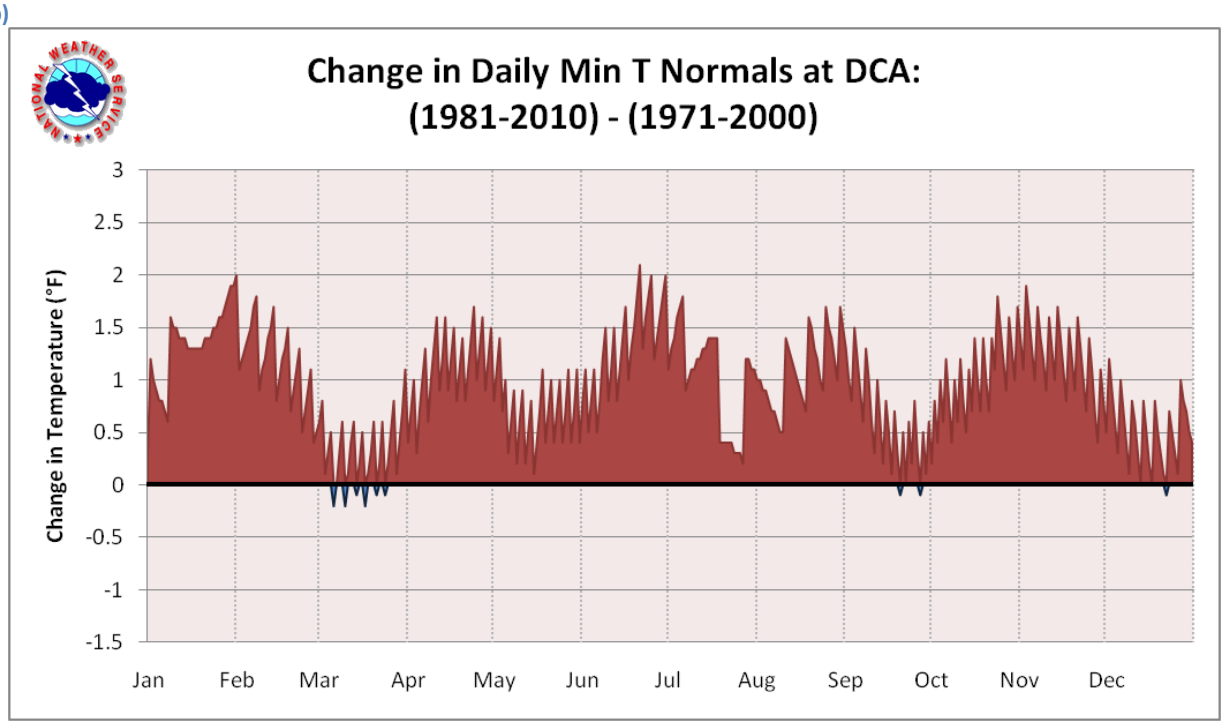


Figure 6. NWS Baltimore/Washington

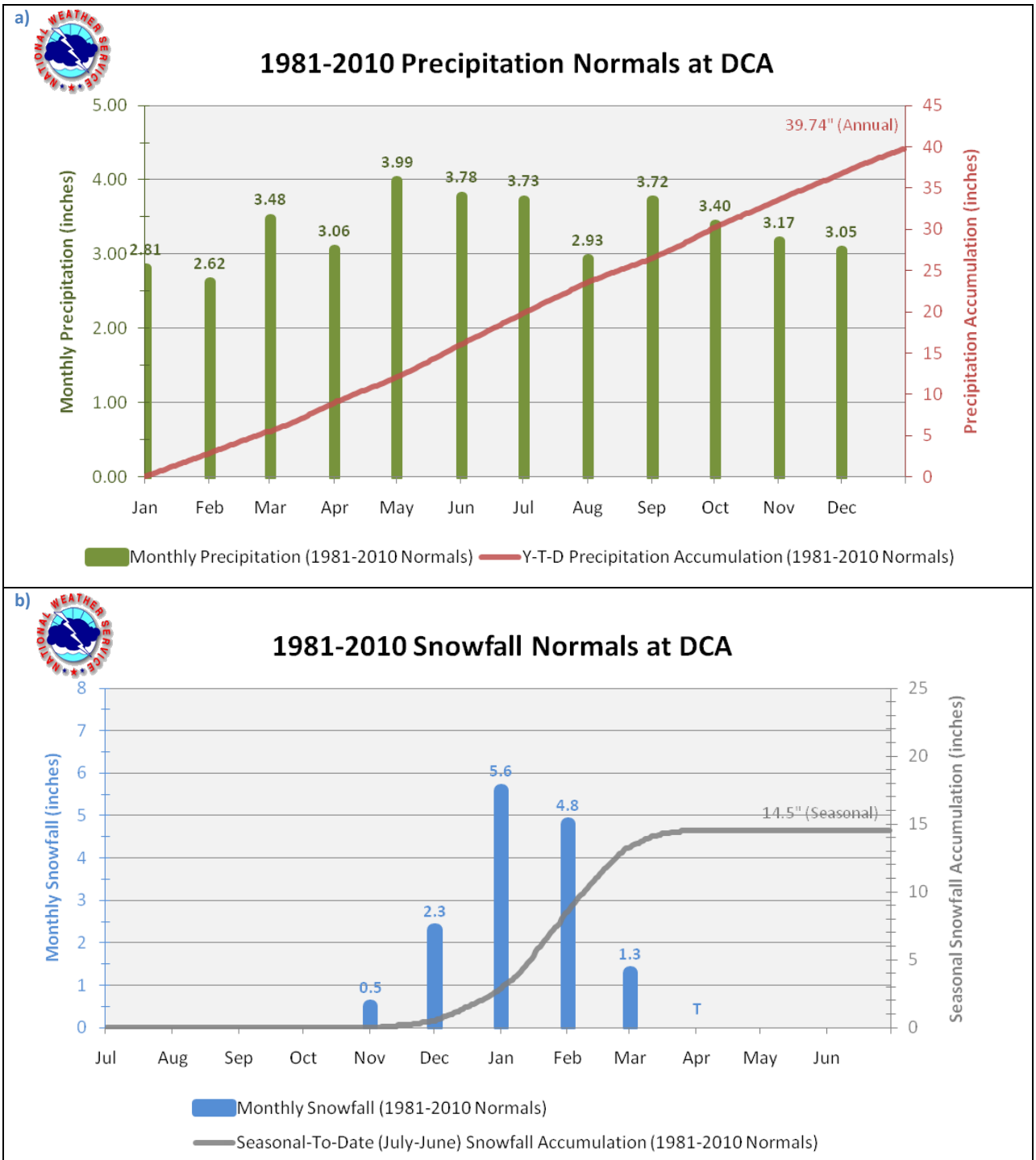


Figure 7. NWS Baltimore/Washington

BWI Normals

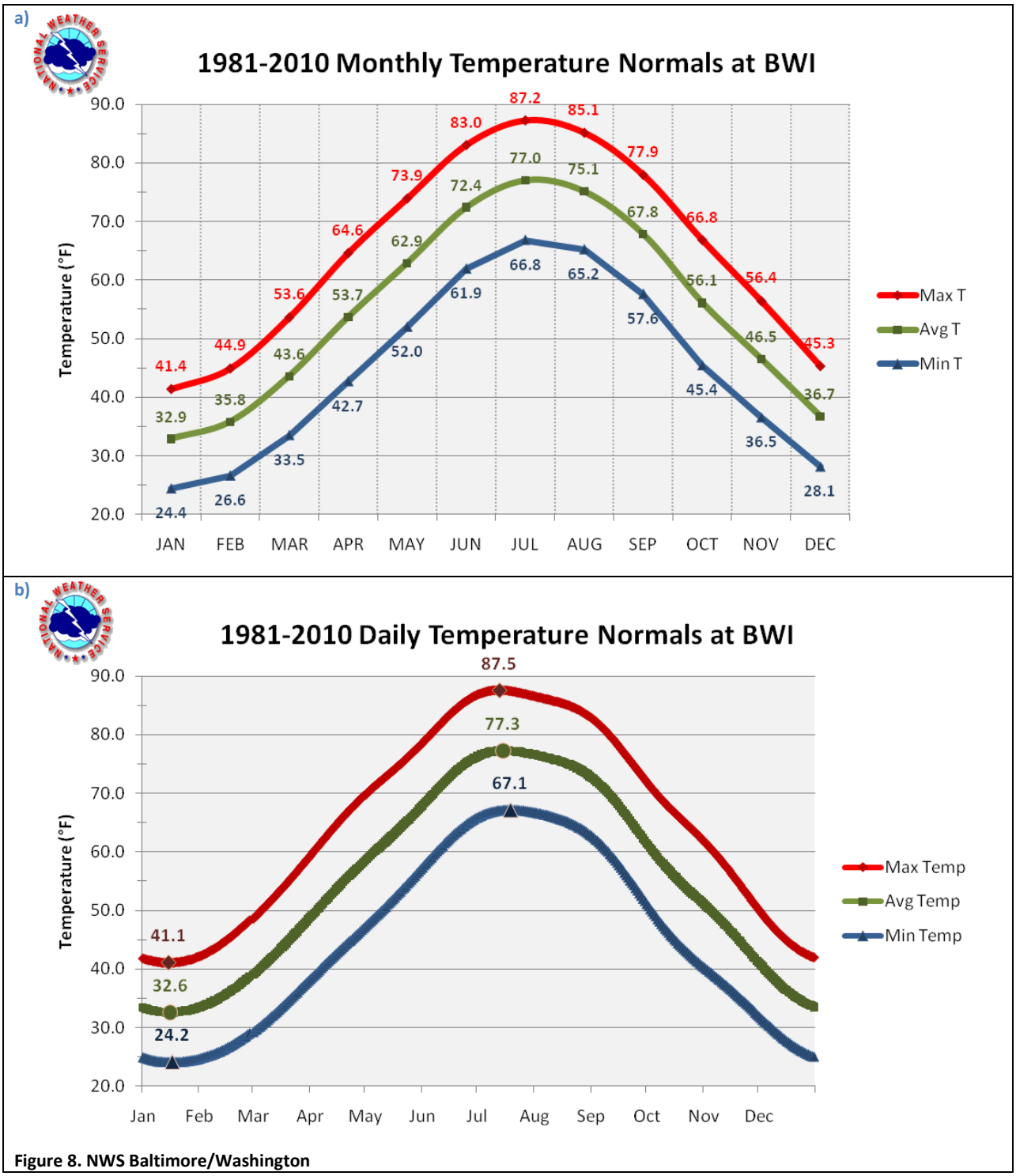
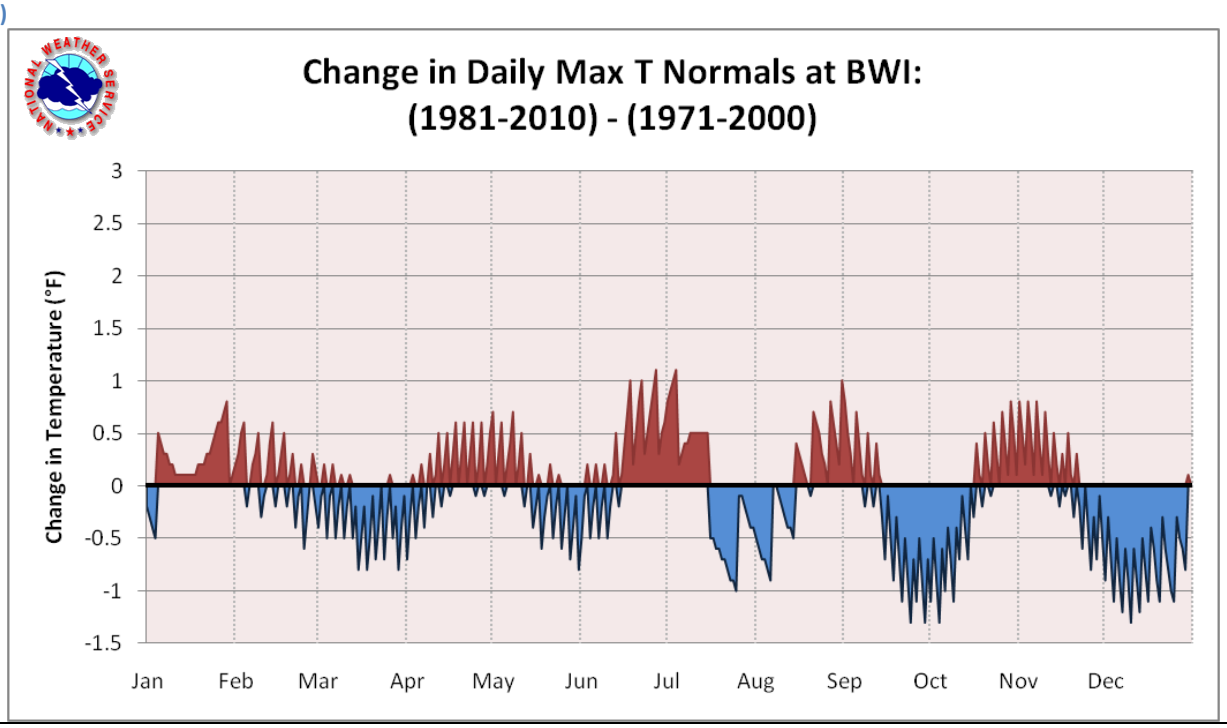


Figure 8. NWS Baltimore/Washington

a)



b)

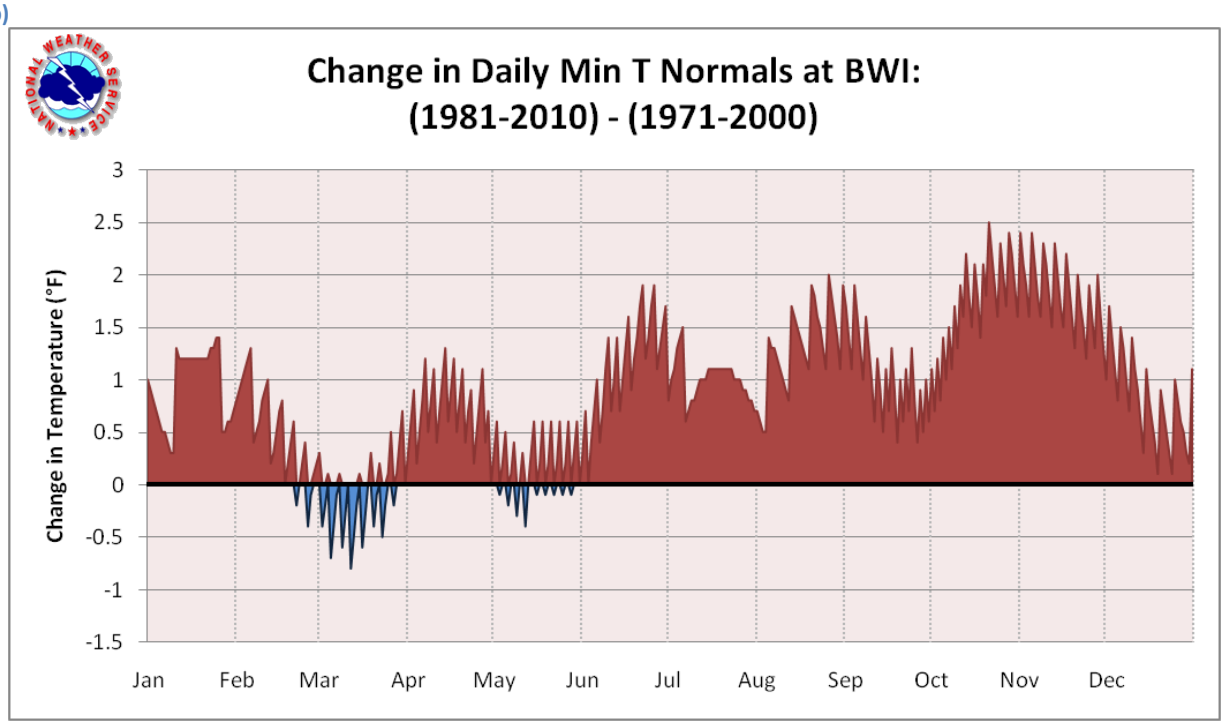
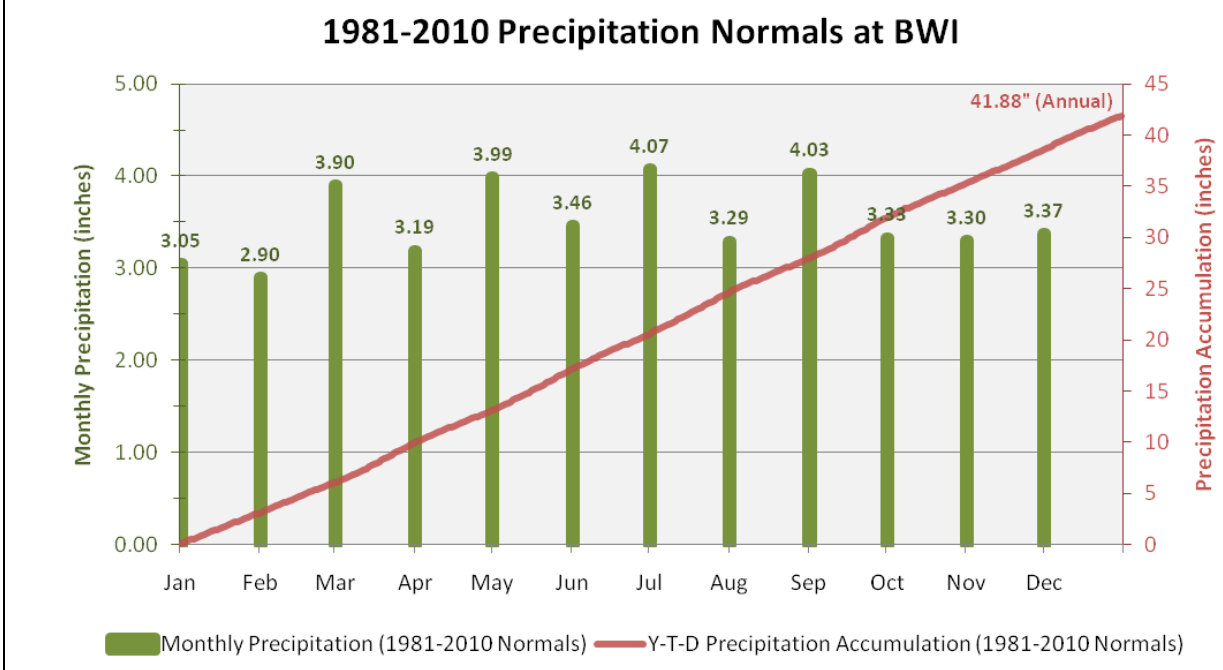


Figure 9. NWS Baltimore/Washington

a)



b)

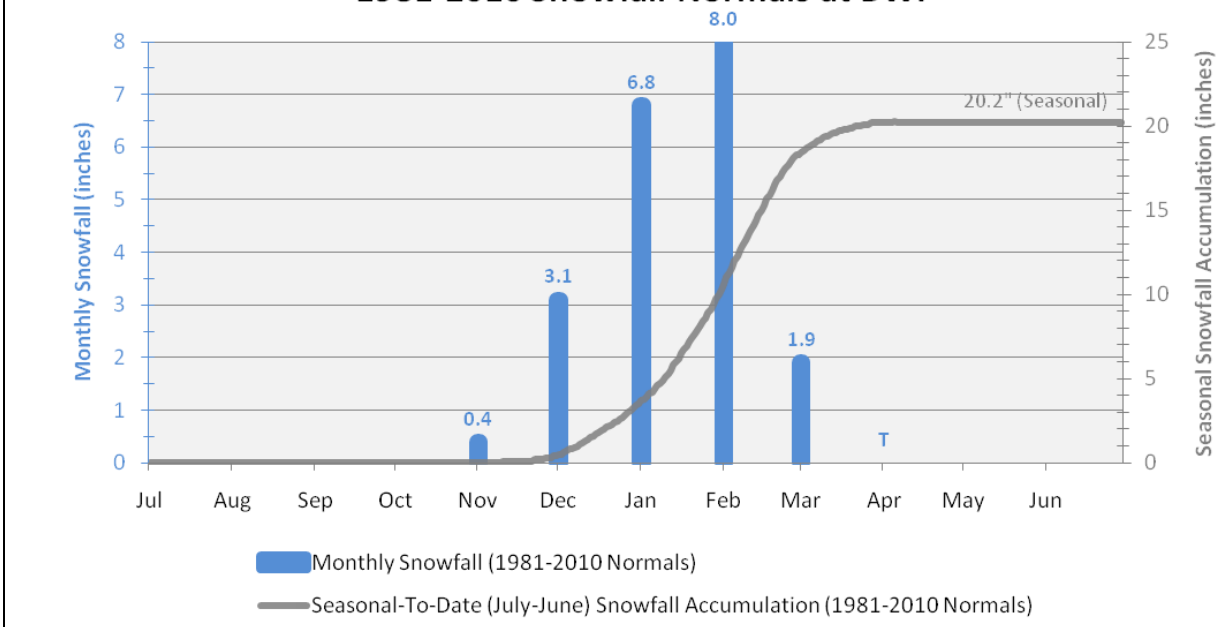


Figure 10. NWS Baltimore/Washington

IAD Normals

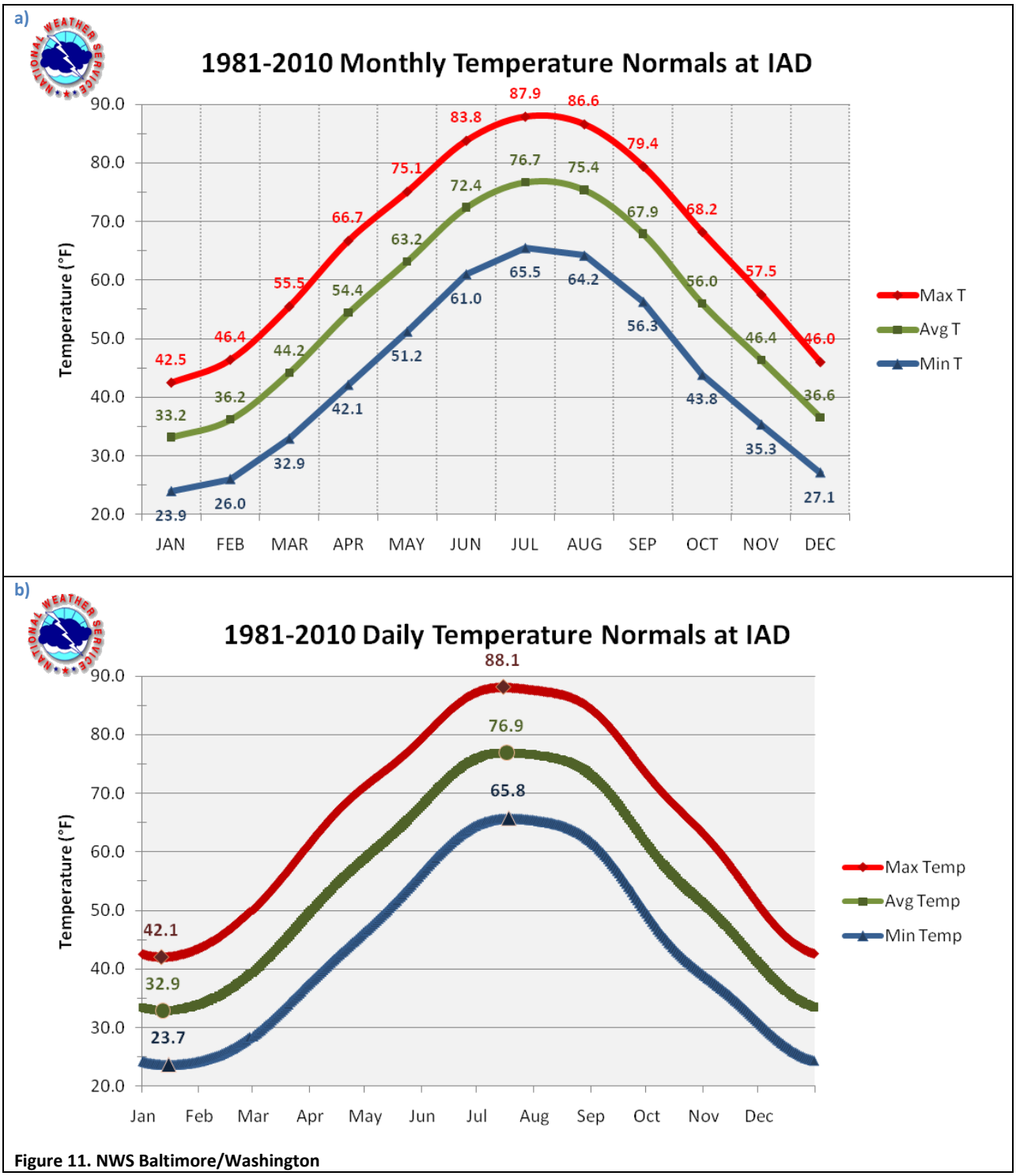
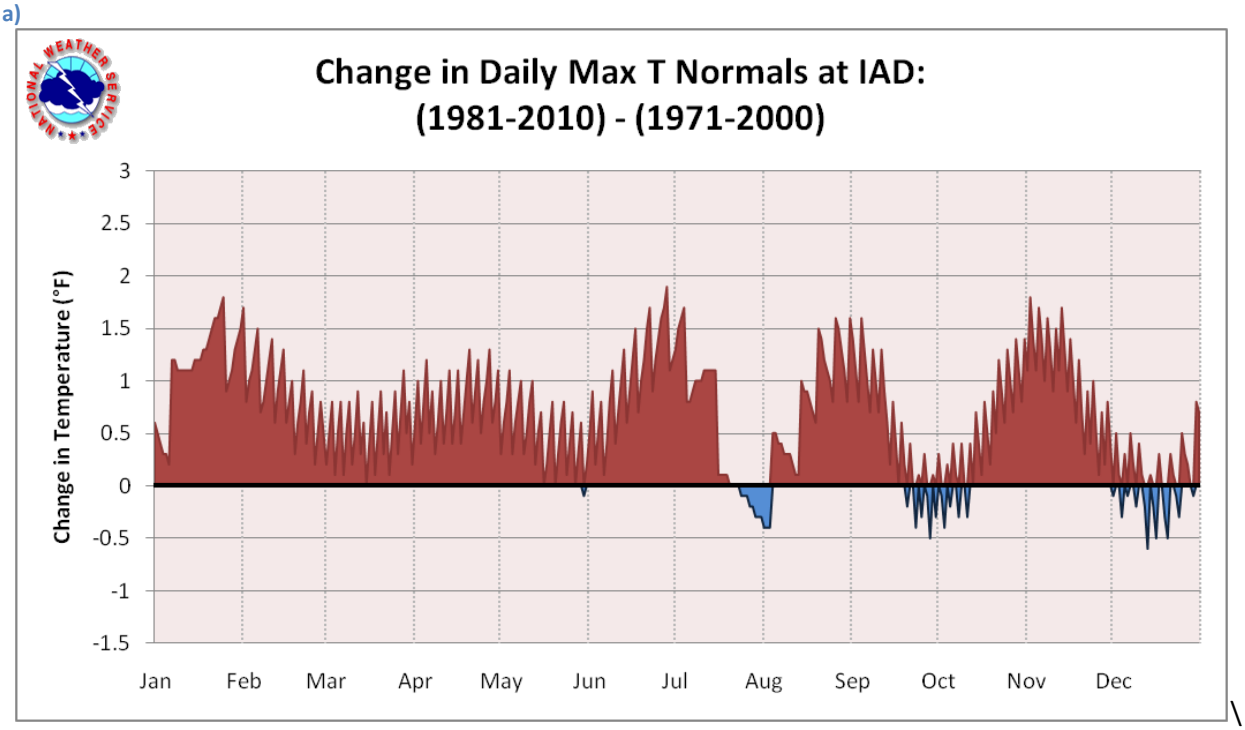


Figure 11. NWS Baltimore/Washington

a)



b)

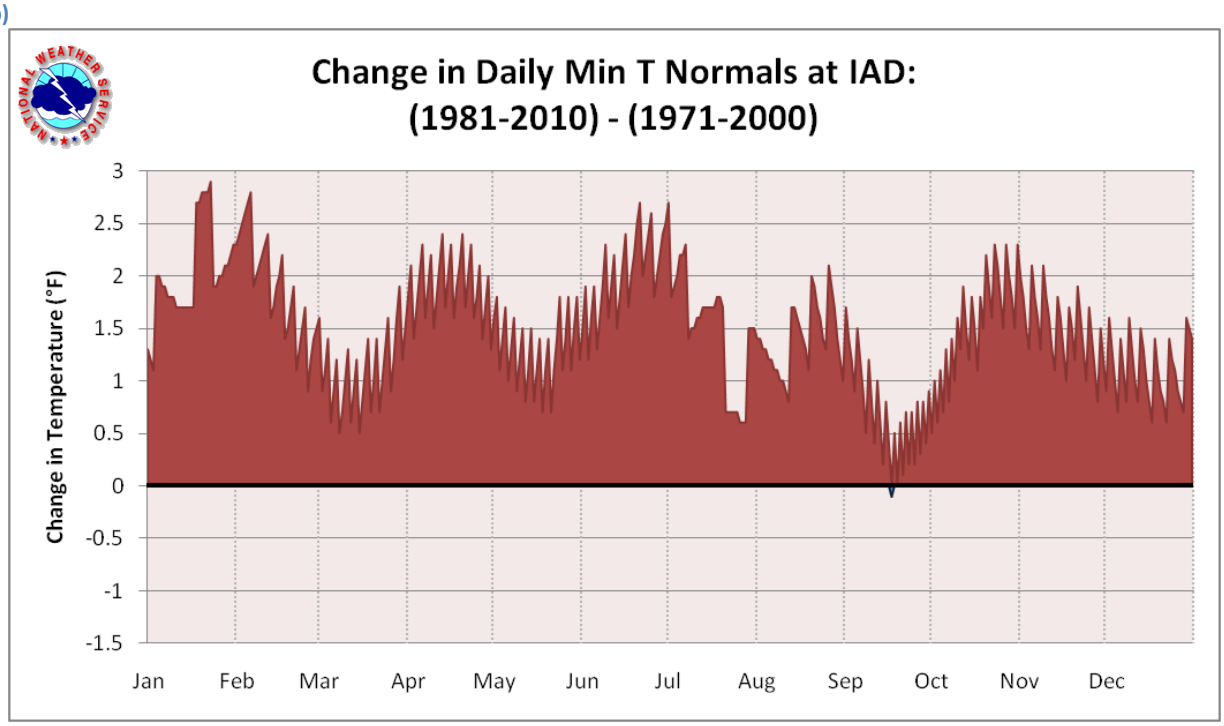


Figure 12. NWS Baltimore/Washington

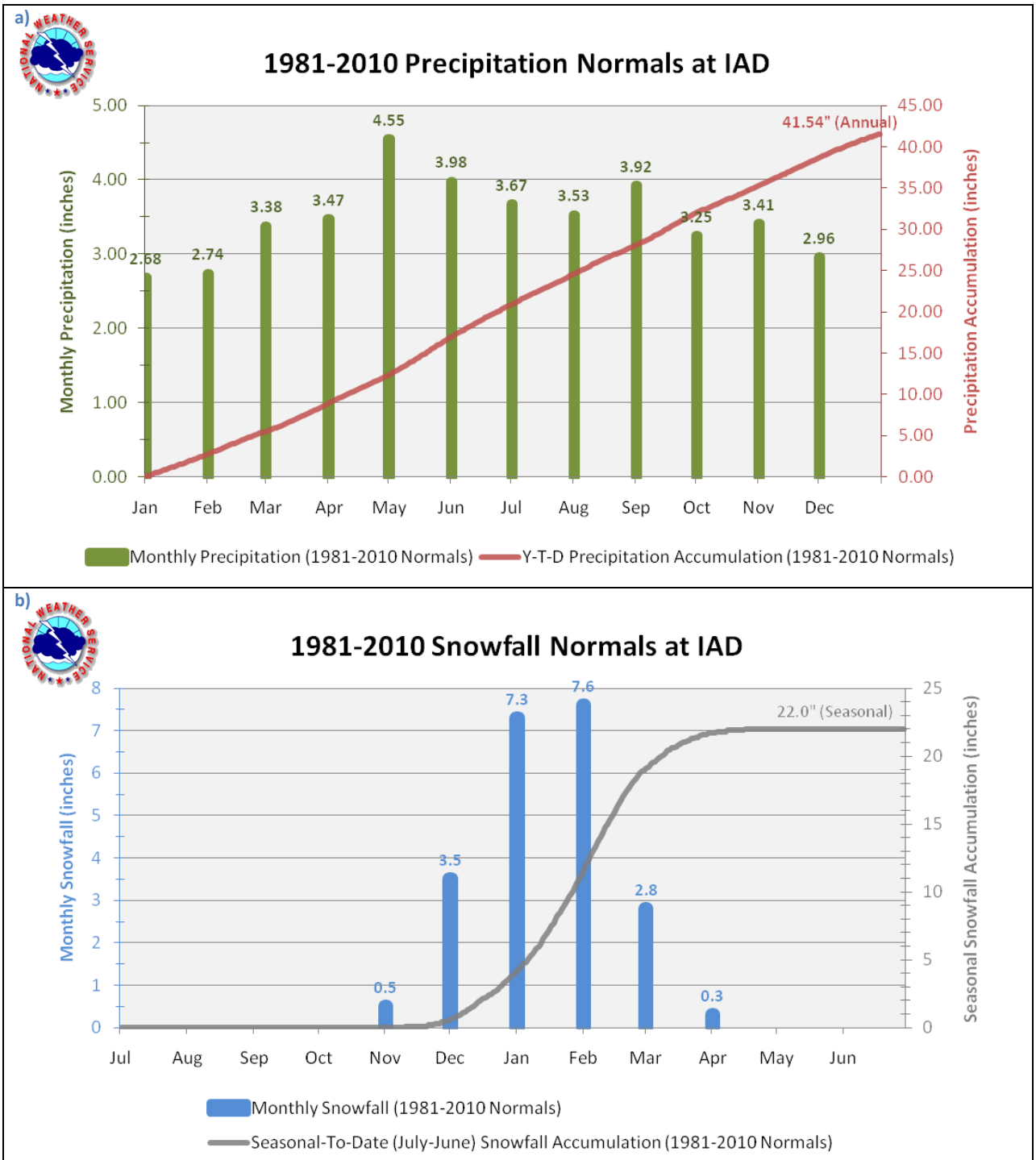


Figure 13. NWS Baltimore/Washington